1:Spier E-5 (1918) 1928
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133 mescal, yucca, and a sparse scrub growth. Still higher is the plateau:
137 at the lower elevations this is covered with sagebrush, chamisas, etc.; at a higher level grow juniper, cedar, and piñon trees; and at the Grand Canyon rim and toward the mountains are pines, spruce, and fir. Water is very scarce on the plateau; springs are found chiefly near the mountains, elsewhere the surface run-off of summer rains and melting snows may be caught behind little dams.

[102]
[131]

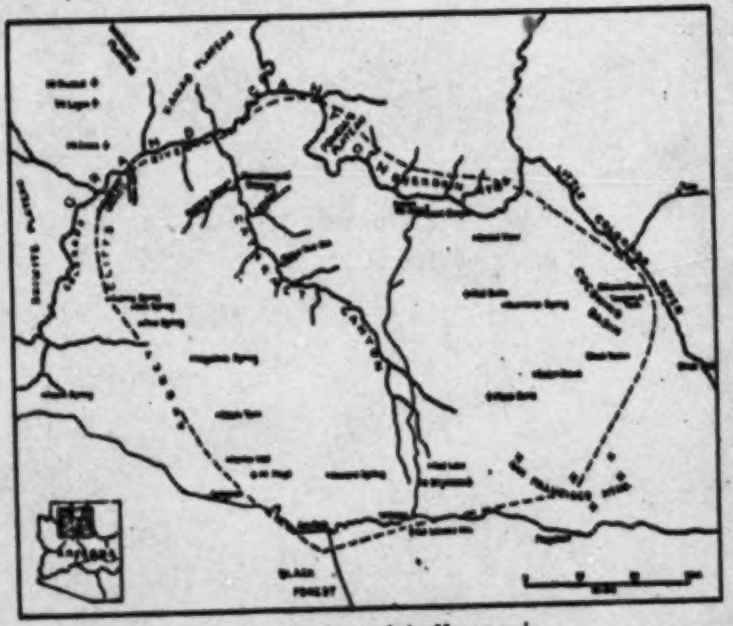

Fig. 1. Territory of the Havasupai.

132 Precipitation is confined to two periods, the heavy summer rains (July to early October) and the winter snowfall (December and January). Its distribution varies from five to fifteen inches per annum over the greater part of the range to a maximum of twenty-five inches near the mountains in the south. The rains are sudden and torrential and the
132 run-off excessive, the accumulated waters rushing into the lower canyon
731 and producing dangerous flood conditions. I witnessed an unheralded cloudburst in August, 1918, when all the heights spurted torrents upon the village below. Everyone fled to the cliffs; the swollen creek swept

[Text continues on p. 94]

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132 731 away houses and destroyed fields. For a week, during which further storms threatened, no one made more than trifling efforts to restore things to their former condition. The severest flood of recent years was that of January, 1911, when a heavy rain brought down the accumulated snows from the plateau, filling the canyon bed quite to the talus slopes, tearing away a third of the field area, and on its subsidence leaving the creek in a new location.

132 The prevailing winds are from the southwest. These blow hardest and are most annoying in the spring, on account of dust storms. The temperature on the plateau varies from a midwinter mean of 30° F. to 70° F. in midsummer; that in the canyon is about ten degrees higher the year round. There is sometimes as much as a foot of snow in the canyon bottom, yet snowfalls are infrequent. Despite the fact that it is 36 warmer in the canyon, the Havasupai prefer to spend the winter on the plateau, partly because it is less humid there, but rather more because there is an adequate supply of good firewood, and chiefly because their interest lies in the hunting, seed gathering, and visiting activities of this season.

131 Beside the village in Cataract Canyon, the Indian Gardens (*hdéedjivá'*, coyote tail?) on Bright Angel trail below Grand Canyon station, and perhaps some similar farm lands elsewhere, as at Prospect Valley, the Havasupai consider a large section of the plateau as their proper range. Its limits are approximately as follows. On the north, the benches on the south side of the Grand Canyon, the Buckskin Mountains, and Powell's Plateau: on the east, perhaps Coconino Basin and the plateau west of it; Hawaigátl'dá, a spring perhaps east of Black Tank, and Pökádcspai'lvá, near Hull Spring (Cedar Ranch) north of the San Francisco peaks, with the whole northern and western slopes of those mountains: on the south, Red Lake at the head of Cataract Canyon, Black (or Kisaha) tank (*hdwaigivilí'*) north of Seligman, Howard Spring (*nolíedhá*), and at least in recent times they hunted in the vicinity of Ash Fork and perhaps north of the Black Forest. The limits on the west are more difficult to define since they commonly occupied [101] certain localities together with the Walapai, for example, Pine Spring (*hakdad*, where there were also Paiute living with them about 1860), and Moho Canyon at the northern end of the Aubrey Cliffs. Beyond these points the Havasupai consider themselves well out of their own territory. Prospect Valley and Pine Spring formerly belonged to the Havasupai alone, the Walapai subsequently crowding them out.

101 It would seem that beyond this range, at least on all save the western side, there was considerable unoccupied territory. Paiute settlements

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[252] Corn is gathered in all stages of ripeness: the first edible ears are welcomed after the winter's dry provender. Green corn is boiled, made into bread, etc. Green corn may be partially roasted in the husk by placing it in a roasting pit over night. The husk is stripped off and the corn dried. Bush ears are boiled during the winter, when they have the taste of fresh corn. When the the ears are ripe and hard the crop is gathered by the men and women who planted it, with the assistance of any one who is willing to help. A woman breaks off the ears as she walks along, throwing them into the burden basket on her back. The corn is spread to dry in the sun, either on the roofs of the rectangular shades, against which ladders conveniently lean, or on heaps of brush around which little smudges of dung are built to scare off rodents. Corn is placed in the stone storage chambers either in the form of husked ears or it is shelled and heaped in a corner. Seed-corn is husked and placed in a separate pile in the storehouse. Pumpkin, squash, watermelon, and sunflower seed are selected for sweetness, dried, bundled in a cloth, and set to one side in the chamber. When going up to the plateau for the winter, two small sacks of corn are carried along: they return for more as it is needed. The corn may be stored in three chambers: that in the first is eaten during the winter, that of the second during the spring planting period, and of the third, only a little may be eaten, not all. "We don't eat it all: we don't plant it all." This remainder is saved against the contingency
● [731] of flood, etc.

Sinyella has five storehouses convenient to his fields; these were all emptied of the previous year's crop by the end of September. His family (p. 212) did not plant much this year as they have no women to grind their corn, so that only one storehouse will be filled. This is intended to supply himself, his four adult sons, and the five grandchildren. If this proves insufficient, more will be given them without compensation by Wes, his younger brother's son, who has plenty this season. Jess, who plants in his parents' field, stores his corn with theirs.

244 In former days two kinds of beans (*naddipá*) were raised, one a big red variety, the other yellow. These were planted in the cornfields on the same day as the corn, placed midway between the cornhills, 10–12 cm. deep, four to a hole. Both crops ripen at the same time. Surplus
[251] beans are also stored in the stone chambers for winter food, leaving enough to plant in the spring.

Squash (*hawáll'*) is planted like beans, at the same depth, four seeds to a hole. Two varieties were known in Sinyella's boyhood, one large and round, the other long. Squash ripens in October. It is brought home by burden baskets full and piled up. The rind is hacked off with a
251 knife and the squash set aside to dry somewhat. The stem end is cut

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sleeper is free from troublesome dreams, will sleep soundly, and arise refreshed. The head of the house or a guest would sleep anywhere he chose. A man's personal belongings were hung over his bed. Food, baskets, etc., were placed nearer the entrance; the food furthest from it to guard against animals. If the house was high enough, a pole on which to hang blankets and skins, was fastened across above man height, but ordinarily this was placed at one side. Cooking is usually done outside.

Every camp has one or more shades which shelter the common domestic activities, and in some instances serve in lieu of a summer house. The shades are built in a great variety of forms; some, in fact, are quite amorphous. The commonest is the rectangular flat-roofed type described above; others are simply a slanting roof, like half a gable, a quarter sphere, like half a dome-shaped house, a barrel vault, and so on. Most are carelessly covered with brush, with dirt banked against them. Ladders (two poles with rungs tied on) are often provided to reach the roof of a house or shade in order to replace the dirt covering, store corn, etc. These are sometimes logs notched on one face. A cooking shelter may be made of boughs set up in a semicircle before the outdoor fireplace, forming a breast-high screen.

There are a series of small caves and rock-shelters (*oyâ''â*) along the cliffs at the top of the talus slope which were used during inclement weather, particularly in the spring, during floods, and the uncertain period when raids were frequent, for they were conveniently located for escape up the cliffs when the alarm was given. A breast-high wall of rocks, laid dry, was built across the opening. Poles were set vertically in the space above the wall, others were tied horizontally across these, and the frame was thatched. A blanket partly covered the entrance, the open space above it providing a smoke vent.

A little ring of brush is raised for a temporary camp. This serves at least to keep out animals and the blowing sand. The White Mountain Apache have a similar usage.

Innumerable storage houses line the ledges at the foot of the cliff all along the canyon, standing high above the reach of floods. A stone wall is built about the mouth of a natural enlargement in a crevice to form a little house of a capacity of 3 to 5.5 cu. m. (Fig. 36). The wall is carefully chinked and plastered with a hard mortar to render it rodent proof. This is made of guano, found in the crevices of the cliff, mixed with dirt. A flat stone is set in the little entrance and sealed with mortar

2:Iliff Y-5 (ca.1901) 1964 NT14 Plateau Yumans NT14
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132 with laughter, released at once from the numbness of strain and fatigue.

We walked back to the buildings, admitting, with chagrin, that we would have been safer and drier had we never left them.

I took my camera and went out to get pictures of the rivers that still cascaded over the rim in five or six places between the school and the village. They were rapidly diminishing in size, but some of them drained in until late the following day.

731 The Indians' gardens and orchards that had been in the path of the main current were washed out and swept over the falls. The houses that stood on low ground were destroyed; however, the sagacity the Indians had acquired through long and bitter experience with floods enabled them to escape without the loss of a life, and with only minor losses of clothing. Each family had a crevice in the canyon walls that made a safe shelter. Here they set up temporary housekeeping.

I expected the children to appear for school Monday morning half-clothed, but only one pair of pants was missing. Six-year-old Dan, face clean, hair brushed and dripping wet, wore his uniform blouse, shoes and stockings, but no pants. He was a comical sight, but no one laughed.

133 731 The Indians warned us that nature would deal us another blow before we could settle down with our usual feeling of security—which wasn't very secure, after all. Many columns of stone stood out from the parent wall, separated from it by fissures in which water from rain or melting snow collected. Freezing weather turned the water into ice, increasing the pressure which widened the crack. This freezing and thawing, over a period of years, left the column unattached. A flood brought such sections tumbling down. This new danger was almost as exciting as the flood had been. It was always a gamble with us, not with the Indians, as to which section would topple over. The one directly back of the school building leaned out threateningly, but when I asked Bob for his opinion, he shook his head.

"Him no fall yet," he assured me, and since Vesnor agreed, we

2:Iliff Y-5 (ca.1901) 1954 NT14 Plateau Yumans NT14
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continued our school sessions. The men pointed out another pillar, farther down the canyon, that endangered neither school nor village, that would come down "four suns, maybe five." 133 131

From the day of the flood, falling boulders and landslides had kept us in an unsettled state, but on the fourth day, as the men had predicted, the big column fell. It leaned out from the wall, toppled crazily, its center buckling, and burst apart with a roar as if the gorge itself had split open and was shaking itself to pieces. A bedlam of sound struck the angled walls to be tossed back, echoing and re-echoing until it seemed there would never be an end to it. We hurried down to view the ruin, arriving before the dust had settled, while the stones were still sliding over one another, groaning and grinding as they shifted to a lower level.

The Indians patiently repaired their houses, dried out the furnishings, rebuilt fences, replanted gardens and orchards. How many times in the past had they undertaken this same task, I wondered. I wondered, too, at the leisurely way they worked, stopping to gamble a little, to visit and make merry for awhile, or to eat food some neighbor brought. If a task could not be done one way, try another; if it could not be done today, try it tomorrow. They had never worked by a clock, nor permitted time to become their master, so they, as a people, remained cheerful, unhurried. 131 461

Portions of the Walapai trail had been wiped out. The Indian men, using their native methods with brush and stones, soon had it passable but dangerous, so we were greatly surprised when several men rode down from the plateau and stopped at the school. One of them, Mr. Jacobs, an engineer in charge of a surveying party on the government reserve, expressed his surprise in finding us alive and the buildings standing. He said, "We watched the storm from our camp a few miles back on the mesa. From there, it looked as if a cloudburst hit right in this canyon. We expected to find this place swept clean as a whistle." 131

According to his report and that of his men, our danger was as real as it had seemed. But now that it was over, I was prepared.

Cliff Y-5 (ca.1901) 1954 NT14 Plateau Yumans NT14
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73/ The next time I was caught in a flood, I'd climb to a crevice and live like an Indian.

Several years later the canyon was again flooded, and this time the destruction was almost complete. The teacher and his wife, the only white people at the school, were no more prepared than we had been. They too had failed to learn from the Indians how to survive a deluge in comfort and safety, so they scrambled to the roof of their house—the same cottage in which we had lived—and climbed from that into the rugged old cottonwood. The old tree weathered the storm, saving their lives. They watched the maelstrom beat against the stone houses until they disintegrated like so many lumps of sugar. Today, the Indians can point out only one stone remaining on the site of the old buildings.

133 In January, 1911, the most disastrous flood of historic times funneled
731 melted snow resulting from a sudden thaw on the plateau and higher canyons into the confines of Cataract Canyon. A churning roar from the advancing waters signaled reservation residents, who made a predawn flight to the talus slopes. A wall of water smashed through the village, leveling primitive hogans and stone government buildings alike and sweeping away crops, food [657] stores, and personal possessions. Since that time some measures have been employed by the Office of Indian Affairs, without complete success, to contain the creek in a permanent channel as it flows through the village area.

[312] An irrigation system, installed about 30 years ago, repeatedly has suffered major damage from floods. The Indian Service plans to install new diversion headings and to build three large aqueducts with permanent footings. This is expected to stabilize the present irrigation system and to add a few more acres to land now being farmed (Kelly 1953, 56).

133 About a mile downstream from the village, Havasu Creek tumbles in a
[648] series of waterfalls which attract tourists. The scenic aspect of Cataract Canyon in recent years has become an economic asset and a precipitator of increasing Havasupai-white contacts.

133 Travertine terraces deposited at the crest of a waterfall eventually
311 divert the falls to another location. A severe flood in 1952 destroyed a 50 ft.
731 fall, lowered the creek channel for some distance upstream and rendered useless the irrigation system servicing fields in the vicinity. Additional floods over the next few years further deepened the river channel, washing out adjacent fields and leaving others without water. However, some new gardens are now being planted at lower levels along the stream where land can be reclaimed.

439 Since the two most spectacular waterfalls are beyond the reservation
648 boundary, concern is felt by the Havasupai that their budding tribal-cooperative tourist enterprise may be doomed. Private business interests may be able to bypass the reservation area by providing transportation into the canyon at the falls and establishing tourist accommodations there.

Climate, Plants and Animals

132 Records of a climatological substation operated at Supai for 14 years between 1899 and 1930 reveal a maximum annual precipitation of 13.87 inches and minimum of 4.50 inches, averaging 8.89. Precipitation was highest in February, July and August (Martin and Kincer 1933, Section 25, p. 14).

Temperatures in Cataract Canyon are consistently higher throughout the year than on the plateau. Snow seldom reaches the canyon floor, but freezing occurs in the coldest months. On sunny winter days when canyon air is cool, the warmest areas are southern exposures along the top of the talus